

***Diastylis tongoyensis*, a new diastylid (Crustacea: Cumacea) from the northern central coast of Chile, with an amendment to the description of *Diastylis crenellata* Watling & McCann, 1997**

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Abstract.—A new species, *Diastylis tongoyensis*, is described based on specimens from north central Chile. *Diastylis tongoyensis* is distinguished from other members of the genus by the unique combination of an opercular maxilliped 3, a short telson, and an unornamented carapace. Pereopods 3 & 4 of *D. crenellata* Watling & McCann, 1997 are also illustrated. Both belong to a group of 9 species in the genus *Diastylis* having an opercular maxilliped 3, reduced exopods on pereopods 3 & 4 of the female and a telson shorter than the uropod peduncles.

Only two species belonging to *Diastylis* Say, 1818 are currently known from Chile, *Diastylis argentata* Calman, 1912 and *D. gayi* Nicolet, 1849. *Diastylis argentata* is described from off southern Chile, and *D. gayi* is described from Isla Grande de Chiloé, also in southern Chile. Both sites are within the Magellanic biogeographic province, and *D. gayi* has not been reported subsequent to its description by Nicolet (1849). *Diastylis tongoyensis* is the first species from the Diastylidae described from the Peru-Chilean province (Fig. 1), which encompasses the west coast of South America from about 40°S to 5°S.

Methods

Samples were collected with a small benthic dredge equipped with a net bag having a mesh opening of 425 μ m, dragged by a small boat for 15–30 minutes in 3–30 meters of water. Because of the need to use the specimens for genetic analysis, samples were preserved directly in 95% EtOH. Drawings were prepared using a *camera lucida* on a Wild compound microscope. Body length was measured from the tip of

the pseudorostral lobes to the posterior border of the last somite.

Family Diastylidae Bate, 1856

Diastylis Say, 1818

Diastylis tongoyensis, new species

Figs. 2–11

Type material.—Holotype (USNM 260767), ovigerous female; paratypes (USNM 260768), 1 adult ♂, 8 subadult ♂, 9 subadult ♀♀, 15 manca 1; paratypes (Museo Nacional de Historia Natural de Chile, Santiago CUM-no. 11153), 1 ovigerous ♀, 7 subadult ♀♀, 8 subadult ♂, 4 manca 1; Bahia Tongoy, Chile, 30°16.67'S, 71°30.25'W.

Other material.—Bahia Tongoy, Chile, 30°16.67'S, 71°30.25'W, 4 ovigerous ♀♀, 30 subadult ♀♀, 2 adult ♂, 31 subadult ♂, 132 manca 1, 381 individuals not sexed. Bahia Guanaquero, Chile, 30°11.66'S, 71°25.30'W, 6 subadult ♀♀, 14 subadult ♂, 80 manca 1.

Diagnosis.—Within the genus, distinguished by the combination of unornamented carapace, telson considerably shorter than uropod peduncles, opercular maxilliped 3, pereonite 1 visible only dorsally,

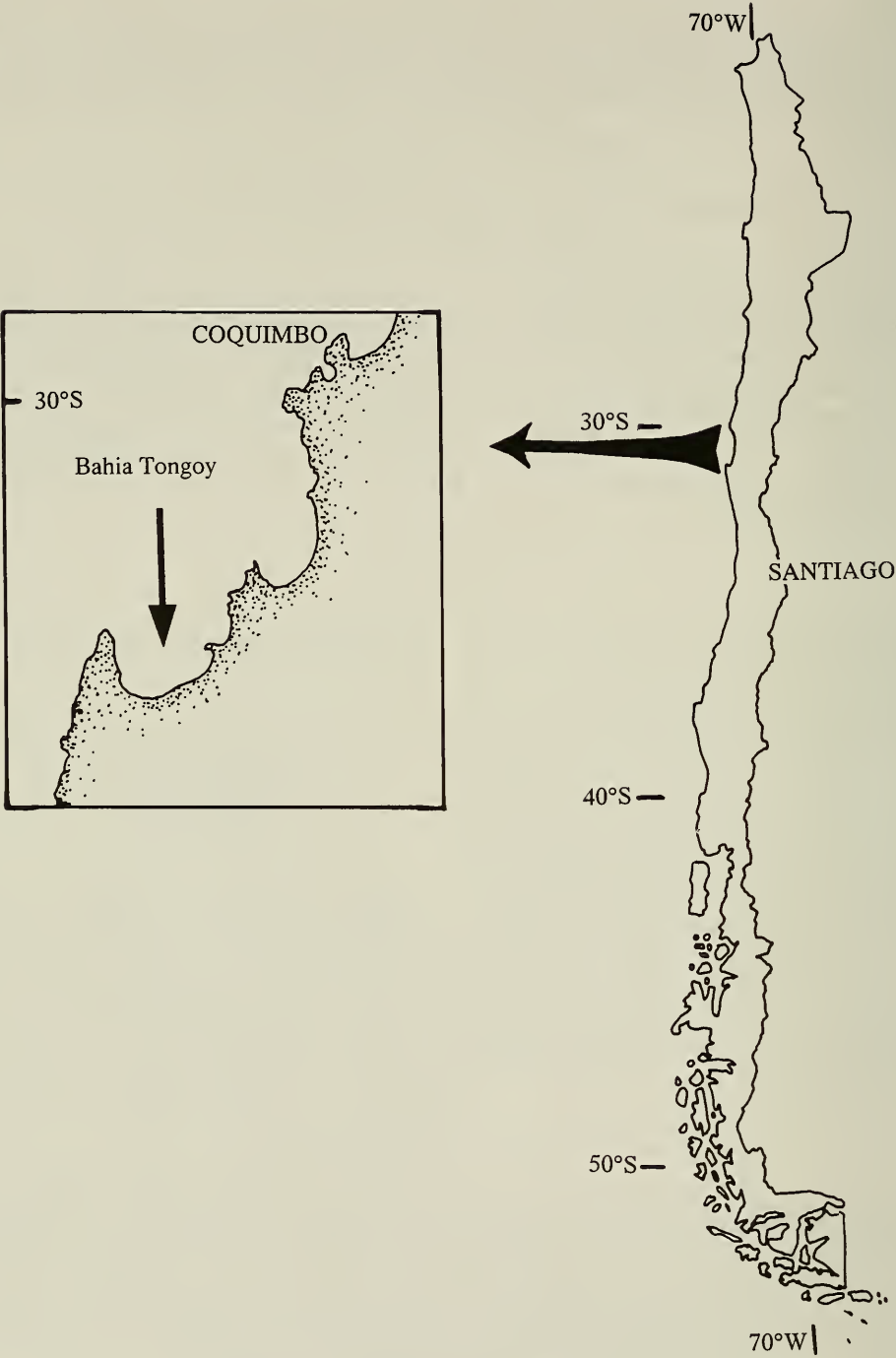


Fig. 1. Map of Chile, with enlargement of Bahia Tongoy area.

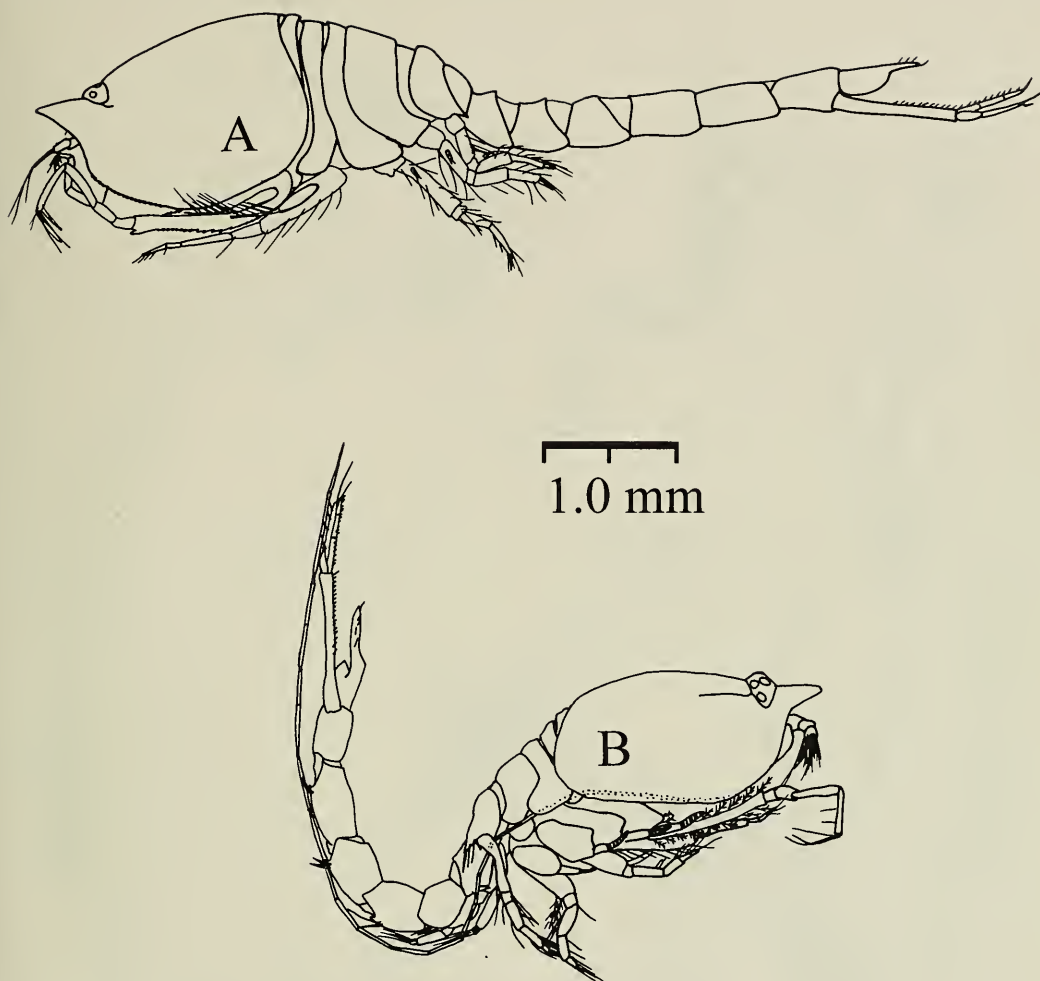


Fig. 2. *Diastylis tongoyensis*, new species. A, adult ♀; B, adult ♂.

and rudimentary exopods on pereopods 3 & 4 in female.

Description.—Ovigerous female, 6.0 mm. Pseudorostral lobes 0.2 carapace length, eyelobe 0.1 carapace length, with 3 lenses; antennal notch oblique; anteroventral corner slightly produced; ventral margin lined with small teeth, otherwise carapace smooth. Branchial siphon not extending beyond pseudorostral lobes. Pereonite 1 nearly obscured by carapace, slightly exposed dorsally. Pereonite 5 produced posteriorly as small acute lappet (Fig. 2A).

Antennule elongate and stout, extending beyond pseudorostral lobes; peduncle arti-

cles 1 and 2 stout, article 3 slender; article 1 with 2 plumose setae distally; article 2 with 2 pedunculate setae distally; accessory flagellum of 2 articles, extending beyond article 1 of main flagellum; main flagellum of 4 articles, bearing 2 stout annulate setae (Fig. 3D).

Antenna rudimentary; article 1 stout, 1 plumose seta distally; article 2 reduced, 1 simple seta distally (Fig. 3E).

Mandible navicular with row of 11 lifting setae. Right lacinia mobilis very stout with two cusps, left lacinia mobilis slender with single cusp (Fig. 4A).

Maxillule with 2 endites; outer endite with

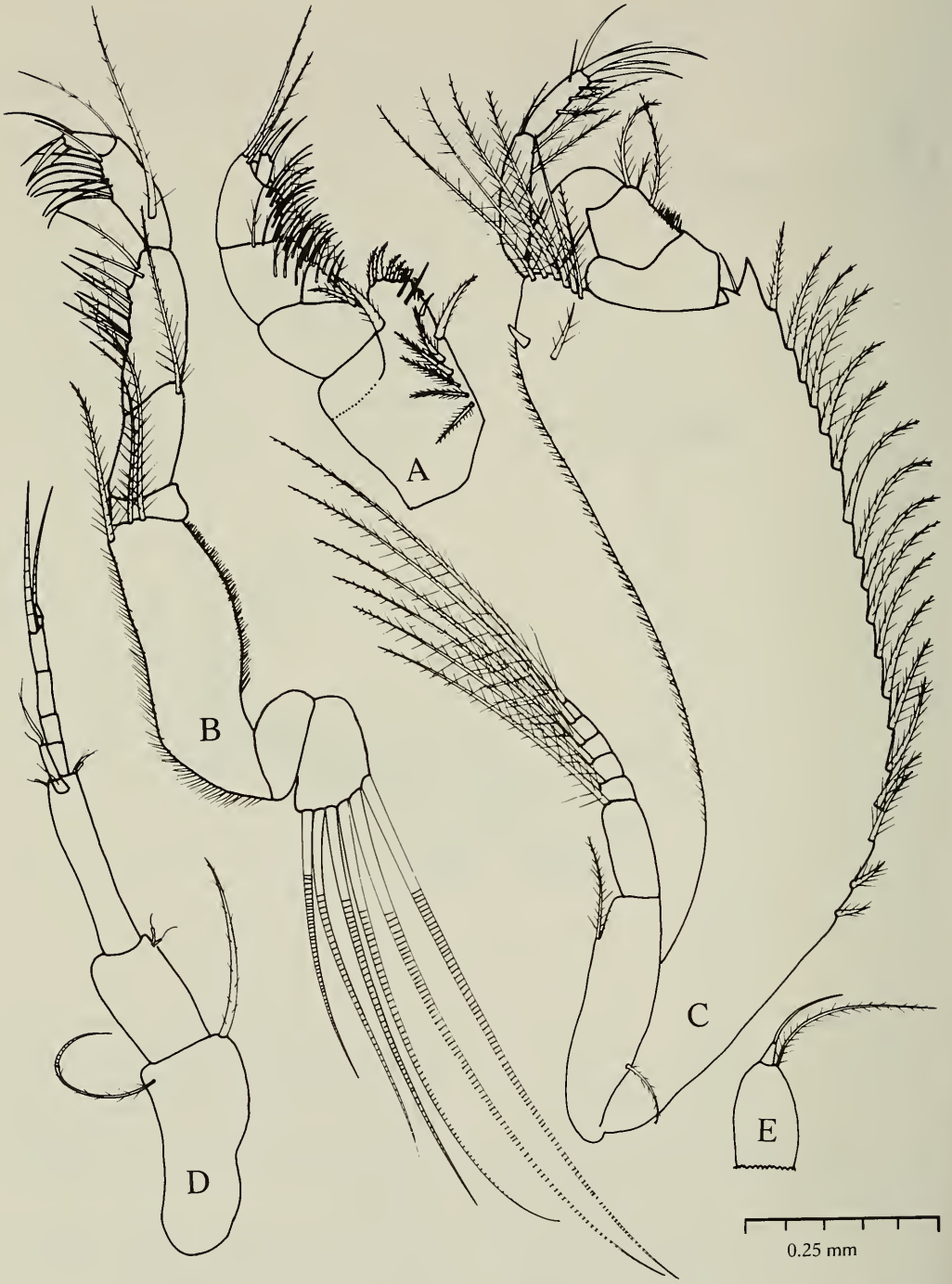


Fig. 3. *Diastylis tongoyensis*, new species. Adult ♀; A, maxilliped 1; B, maxilliped 2; C, maxilliped 3; D, antennule; E, antenna.

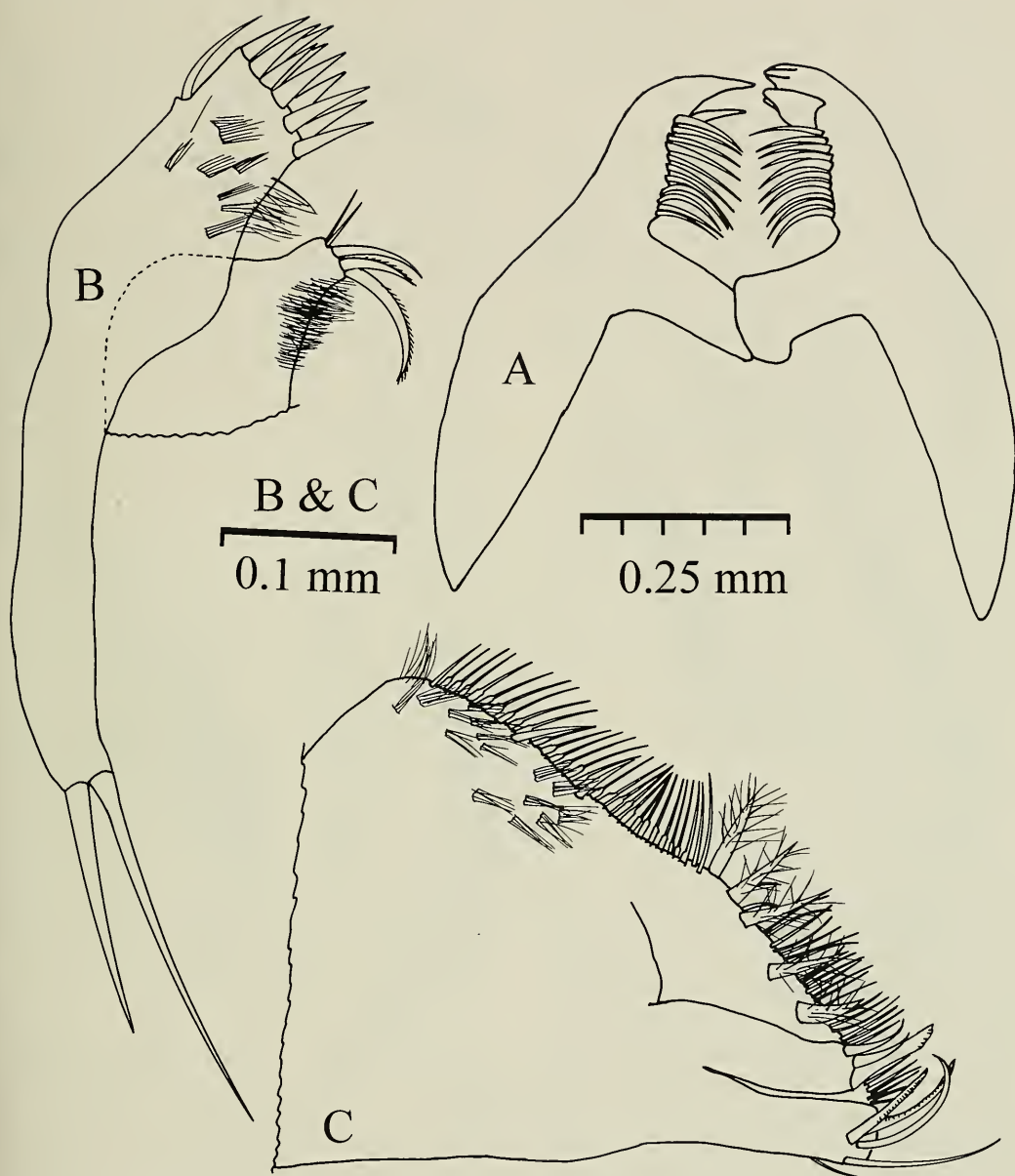


Fig. 4. *Diastylis tongoyensis*, new species. Adult ♀; A, mandibles; B, maxillule; C, maxilla.

double row of stout simple setae distally, 1 slender simple seta on lateral margin, anterior face with several groups of very fine simple setae; inner endite with 5 setae terminally, 2 stout micro serrate setae, 1 stout simple seta, 2 slender simple setae, anterior face with many fine simple setae; palp with 2 long stout simple setae distally (Fig. 4B).

Maxilla with 3 endites; broad endite distal half of medial margin with double row of fine simple setae, 5 large stout papose setae, proximal half of medial margin with row of 29 simple setae, 2 stout simple setae set below row, many groups of fine simple setae on anterior-medial face; inner narrow endite with 3 setae terminally, 2 stout sim-

ple setae, 1 broad blade-like seta; outer narrow endite with 4 long setae terminally, 2 micro serrate and 2 simple, lateral margin with 1 simple seta (Fig. 4C).

Maxilliped 1 basis produced distally as blunt lobe, 2 hooks medially, medial margin beset with stout plumose setae; ischium partially fused; merus with 2 stout plumose setae; carpus and propodus subequal, both with field of slender plumose setae on medial face, propodus also bearing 2 long plumose setae distally; dactyl reduced, bearing 2 short simple setae distally (Fig. 3A).

Maxilliped 2 endite with 5 long stout annulate setae; basis margins lined with fine hairs, distal medial corner with 3 long plumose setae; ischium compressed, bearing no setae; merus, carpus, propodus subequal in length, merus distal lateral corner bears single long plumose seta; carpus medial margin bearing row of slender sparsely plumose setae; propodus with 1 long plumose seta proximally, row of slender simple setae on distal half of medial margin; dactyl with 3 simple setae, 1 stout and 2 slender (Fig. 3B).

Maxilliped 3 basis expanded, twice as long as all other articles together, medial margin with row of stout plumose setae, lateral margin beset with fine hair setae, distal lateral corner with group of long plumose setae, slightly proximally 2 stout setae, 1 simple and 1 plumose, distal medial corner produced as 2 teeth with short slender simple seta between; ischium broad, incised distally, with no setae; merus medial distal margin with 2 long plumose setae and 1 short slender plumose seta, medial proximal margin beset with fine hairs; carpus reflexed, without setae; propodus bearing 2 long plumose setae on medial distal margin; dactyl medial margin with 3 short plumose setae, tip with simple setae, 2 stout and 4 slender; exopod basal article with 1 proximal and 1 distal plumose seta, flagellum bearing many long plumose setae, basis and flagellum together half endopod basis length (Fig. 3C).

Pereopod 1 basis as long as carpus, pro-

podus, dactyl together, anterior and posterior margins with many long plumose setae, distal margin with row of long plumose setae on medial margin, lateral margin produced as 2 large teeth, basis body with stout triangular scales that appear as teeth on margins; ischium with tooth on distal corner, otherwise unarmed; merus longer than ischium, unarmed; carpus, propodus, dactyl subequal in length, carpus with few delicate setae, propodus distal corner with single long plumose seta; dactyl with 3 plumose setae distally; plumose setae on propodus and dactyl having closely set short setules, not similar to plumose setae on basis; exopod shorter than endopod basis, basal article with 5 short plumose setae, flagellum with many long plumose setae (Fig. 5A).

Pereopod 2 basis slightly expanded, as long as next 4 articles together, anterior and posterior margins with many long plumose setae; ischium short, posterior margin with 1 long plumose seta; merus 4 times ischium length, distal corner with 1 plumose seta; carpus longer than propodus and dactyl together, unarmed; propodus half as long as dactyl, 1 simple seta distally; dactyl with several simple setae; exopod longer than endopod basis, exopod basal article shorter than flagellum with 3 slender plumose setae posteriorly, flagellum with many long plumose setae (Fig. 6B).

Pereopod 3 basis as long as remaining articles combined, with 2 pedunculate setae at distal corner, armed with several long plumose setae and 2 smaller annulated setae; ischium margin with several plumose setae and several annulate setae; merus as long as carpus and propodus together, distal corner with single annulate seta, lateral face with 1 annulate seta; carpus margin lined with long annulate setae, carpus as long as dactyl and propodus together; propodus unarmed; dactyl 0.5 width of propodus, single very stout simple seta distally; exopod reduced, 2 small articles, distal article bearing single annulate seta and several fine setae (Fig. 7B).

Pereopod 4 basis as long as merus and

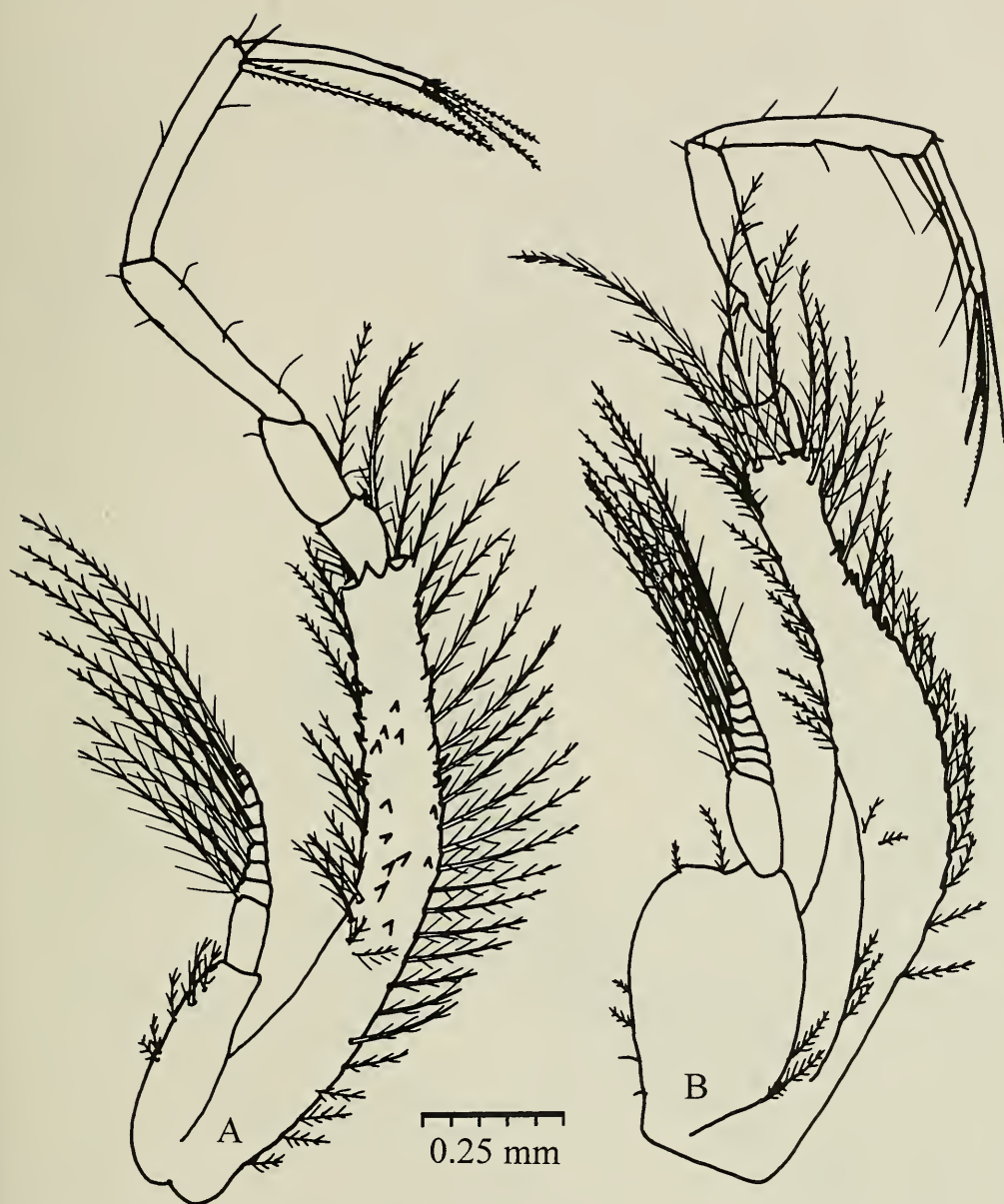


Fig. 5. *Diastylis tongoyensis*, new species. A, adult ♀ pereopod 1; B, adult ♂ pereopod 1.

carpus together, posterior margin with several long stout plumose setae, 1 pedunculate seta and 3 slender annulate setae on outside; ischium with 5 long annulate setae; merus half basis length, posterior margin with 4 long annulate setae; carpus with row of long stout annulate setae distally, few slen-

der annulate setae not on margin; propodus with 1 extremely stout annulate seta distally; dactyl reduced, 0.5 width of propodus, bearing single short stout seta distally; exopod reduced, 2 articles, distal article with 1 plumose seta (Fig. 6A).

Pereopod 5 basis as long as merus and



Fig. 6. *Diastylis tongoyensis*, new species. Adult ♀; A, pereopod 4; B, pereopod 2.



Fig. 7. *Diastylis tongoyensis*, new species. A, adult ♂ pereopod 4; B, adult ♀ pereopod 3.

carpus together, distal corner with 1 plumose seta, proximally 2 plumose setae, distally 1 stout annulate seta; ischium distal corner with single annulate seta, row of 3 annulate setae laterally; merus $\frac{2}{3}$ basis length, margins with few slender annulate setae; carpus with 2 long annulate setae distally, 5 short annulate setae on outside; propodus with single extremely stout annulate seta distally; dactyl reduced, 0.5 width of propodus, with 1 short stout simple seta distally (Fig. 8D).

Telson length 0.7 length of uropodal peduncles, pre-anal and post-anal sections subequal in length, post-anal portion very slender with 3 pairs of lateral setae, 1 pair of short stout simple setae terminally (Fig. 9A).

Uropod peduncles longer than rami, peduncle medial margins armed with 9 or 10 stout setae. Uropod endopod of 3 articles; article 1 medial margin with 4 stout setae, lateral margin with 2 pedunculate setae, lateral distal corner with single seta; article 2 medial margin with 3 setae, lateral distal corner with single seta; article 3 medial margin with 2 setae, lateral margin with single pedunculate seta, 1 large stout seta and 1 small slender seta on distal margin. Uropod exopod of 2 articles; article 1 one-fourth length article 2, armed with 1 short seta; article 2 lateral margin lined with simple setae, medial distal corner with single seta, distal margin with 2 long stout setae. All setae on medial margins, both peduncle and endopod, and large seta on the endopod distal margin, short, stout setae with single setule sub-terminally (Fig. 9A).

Adult male, 5.8 mm. Carapace pseudo-rostral lobes 0.2 total carapace length, not upturned; antennal notch completely oblique; anteroventral corner slightly serrate, otherwise smooth. Carapace generally smooth. Eye large, 0.7 length of pseudo-rostral lobes, with at least 3 lenses. Branchial siphon not extending beyond pseudo-rostral lobes. Pereonite 1 almost completely covered by carapace, exposed dorsally. Pereonite 5 produced acutely

posteriorly, much longer than in female, with 4 long terminal setae on lappet. Pleonites 1–5 with 2 setae on each posterior-ventral corner (Fig. 2B).

Antennules much longer than pseudorostral lobes, peduncle articles very stout; article 1 equal to articles 2 and 3 together, margins beset with fine hairs, 2 simple short setae distally; articles 2 and 3 subequal, article 2 unarmed; article 3 entire distal margin bearing very slender setae, equal in length to peduncle of main flagellum; accessory flagellum of 3 articles, proximal article bears single pedunculate seta proximally; main flagellum of 5 articles, distal article bears 2 simple setae, as long as setae on article 3 (Fig. 10A).

Antennal peduncle of 5 articles; first 4 articles equal in length to article 5, articles 1 and 2 subequal; article 1 with 1 plumose seta; article 2 with 2 plumose setae; articles 3 and 4 subequal, together equal to article 2, both unarmed; article 5 stout, with 19 rows of fine setae on anterior margin; flagellum extends at least to end of uropod rami, comprising at least 20 articles, each article bearing several rows of fine setae, articles increasing in length and decreasing in width distally (Fig. 8A).

Maxilliped 3 basis expanded, medial margin with many short plumose setae; ischium expanded, incised distally, unarmed; merus medial margin with 2 short plumose setae; carpus reflexed, unarmed; propodus medial margin with 2 long simple setae, distally 2 short simple setae; dactyl margins with several simple setae, 2 long simple setae distally. Exopod 0.7 endopod basis; exopod basal article expanded, unarmed; flagellum bearing long plumose setae (Fig. 11B).

Pereopod 1 basis equal to all other articles together, with plumose setae on anterior, posterior, and distal margins, increasing in length distally, medial margin with several teeth; ischium shorter than merus, unarmed; merus with 2 small setae distally; carpus with 2 small simple setae on margin; propodus longer than carpus, with 3 slender

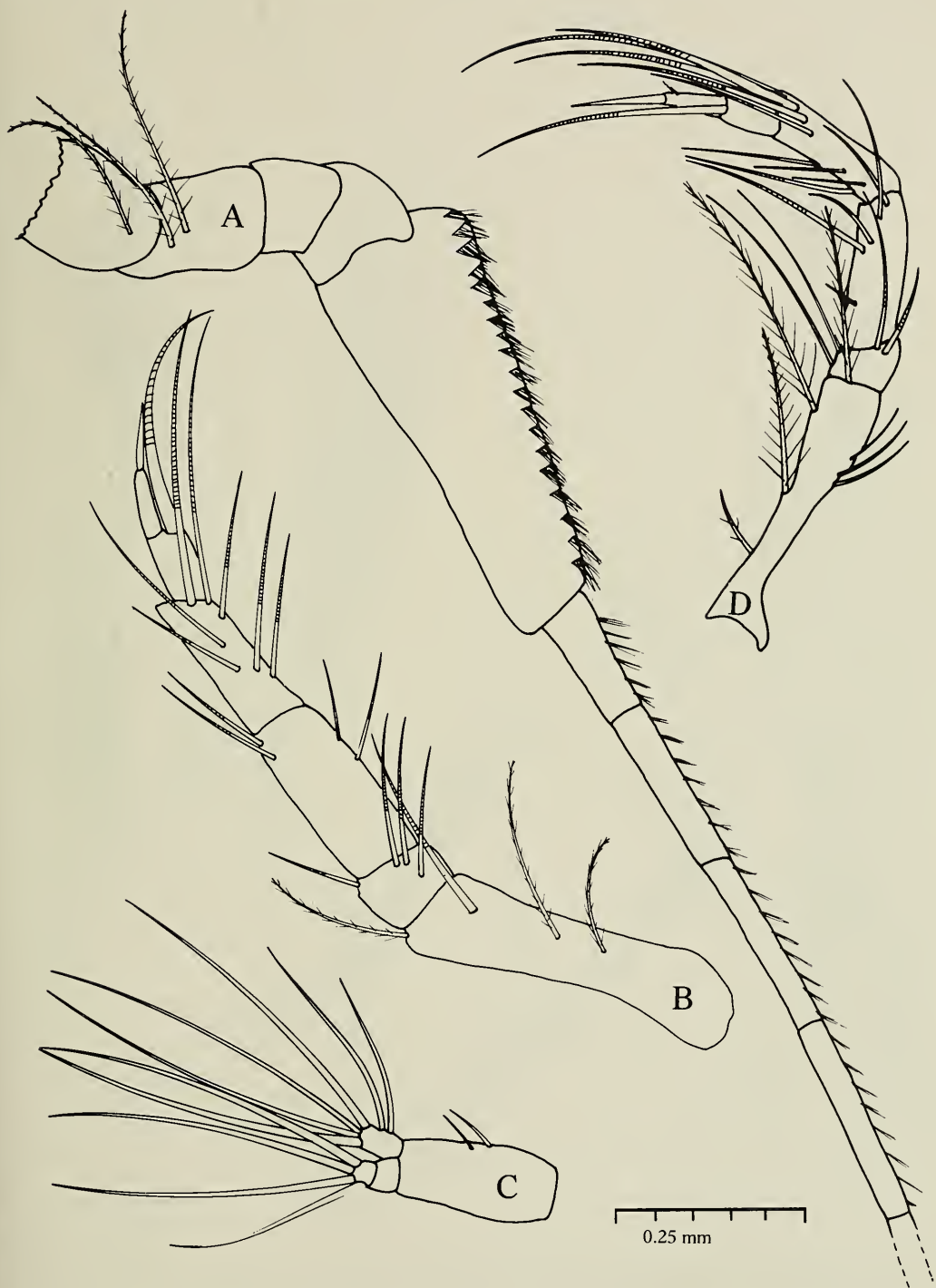


Fig. 8. *Diastylis tongoyensis*, new species. A–C, adult ♂, D, adult ♀; A, antenna; B, pereopod 5; C, pleopod 2; D, pereopod 5.

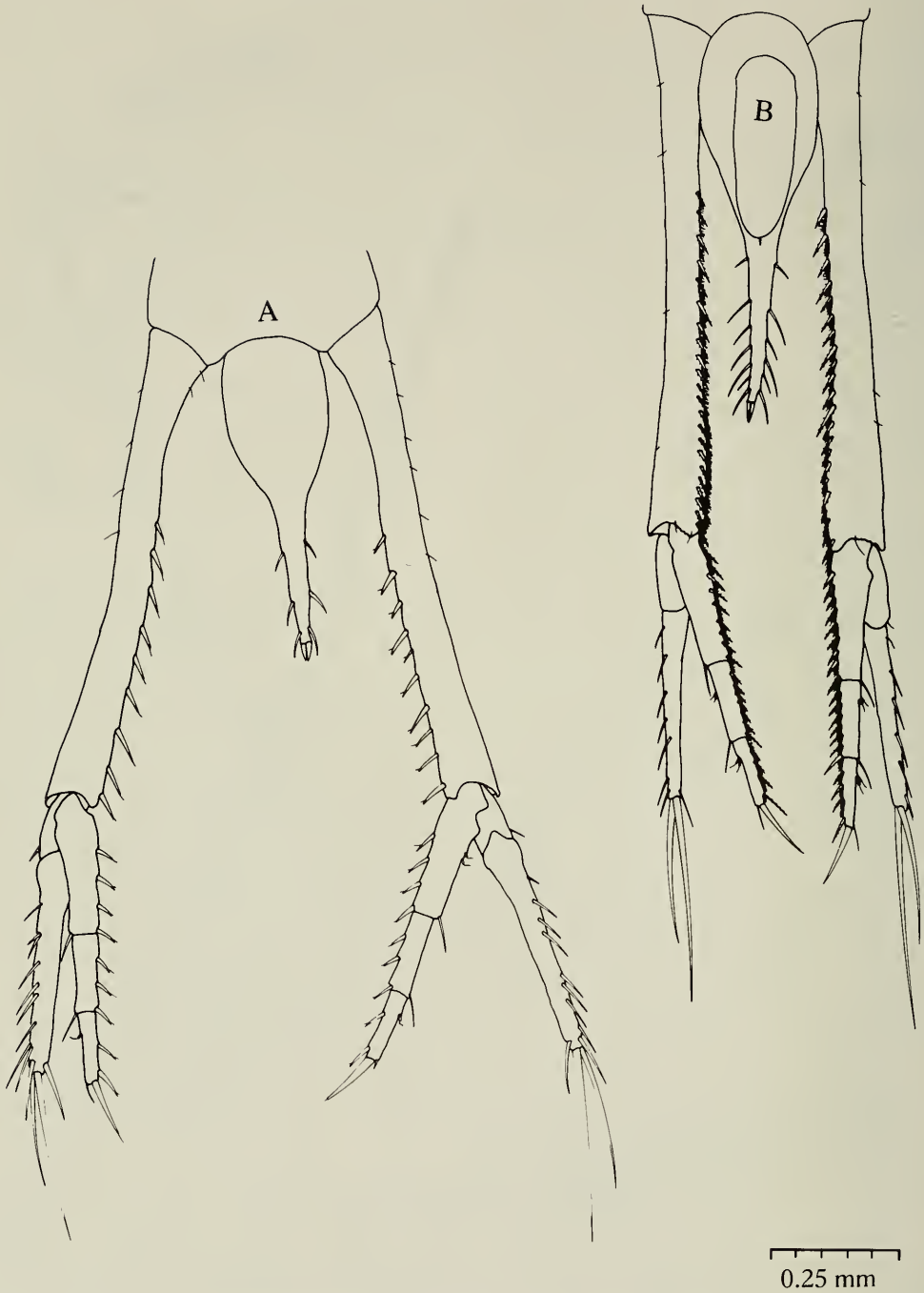


Fig. 9. *Diastylis tongoyensis*, new species. A, adult ♀ telson and uropods; B, adult ♂ telson and uropods.

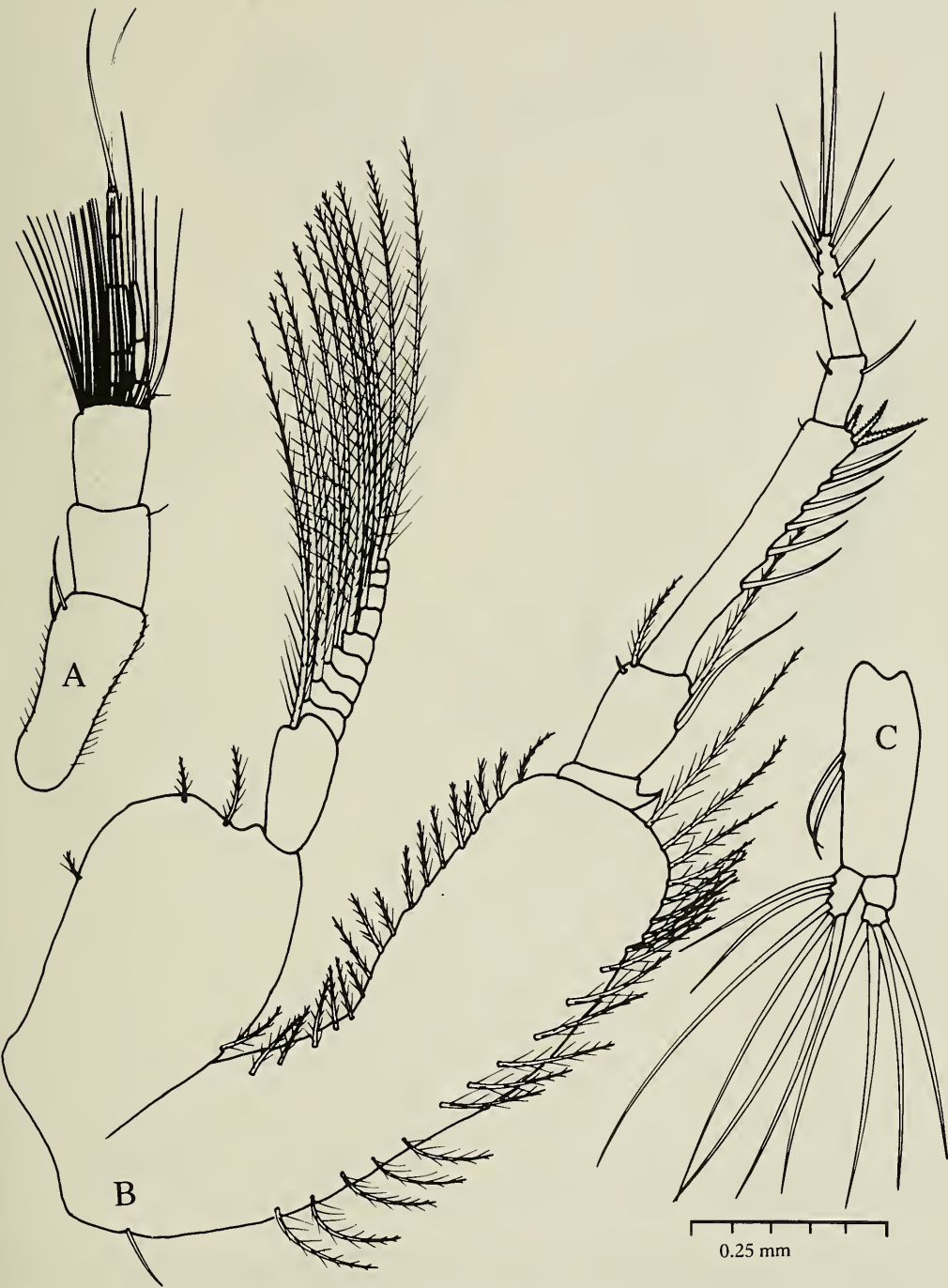


Fig. 10. *Diastylis tongoyensis*, new species. Adult ♂; A, antennule; B, pereopod 2; C, pleopod 1.



Fig. 11. *Diastylis tongoyensis*, new species. Adult ♂; A, pereopod 3; B, maxilliped 3.

simple setae on margin; dactyl subequal to carpus, posterior margin with 3 simple setae, distal margin with 4 long serrate setae; exopod three-fourths length endopod basis; exopod basal article expanded, with few short plumose setae, flagellum bears many long plumose setae (Fig. 5B).

Pereopod 2 basis expanded, length equal to all other articles together, margins beset with plumose setae, increasing in length distally; ischium shorter than wide, produced as large marginal tooth, otherwise unarmed; merus one-third length of carpus, distal corners with plumose setae, single



Fig. 12. *Diastylis crenellata* Watling & McCann 1997. Adult ♀; A, pereopod 3; B, pereopod 4.

long simple seta and single small simple seta on margins; carpus margin with row of stout simple setae, distal corner with group of 3 stout serrate setae; propodus half dactyl length, with 2 simple setae; dactyl lateral

and distal margins with several long simple setae, increasing in length distally; exopod as long as endopod basis, ischium, merus together, basal article expanded, armed with few short plumose setae, flagellum longer

than basal article, bearing many long plumose setae (Fig. 10B).

Pereopod 3 basis as long as remaining articles together, expanded, bearing few plumose setae; ischium short, distal margin with row of annulate setae; merus margin with 3 long annulate setae, lateral face of article with several small simple setae; carpus as long as propodus and dactyl together, posterior margin with row of short annulate setae and anterior margin with row of stout long annulate setae; propodus with single extremely stout annulate seta distally; dactyl with single short stout simple seta distally; exopod as long as first 4 articles of endopod together, basal article expanded with 2 short plumose setae and 1 stout simple seta distally, flagellum bearing many long plumose setae (Fig. 11A).

Pereopod 4 basis as long as ischium, merus, carpus together, expanded, few short simple setae on margin, distally 2 long plumose setae and 1 long simple seta; ischium with row of long simple setae distally; merus as long as carpus and propodus together, anterior margin with 4 long simple setae; carpus anterior margin with 2 long annulate setae, posterior margin with single short simple seta, distal margin with row of long stout annulate setae; propodus as long as dactyl, bearing 1 extremely stout, long annulate seta distally; dactyl 0.5 width of propodus, bearing short stout simple seta distally; exopod as long as endopod basis and ischium together, basal article expanded and unarmed, flagellum bearing many long plumose setae (Fig. 7A).

Pereopod 5 basis narrow proximally, as long as ischium and merus together, posterior margin with 3 long plumose setae, anterior margin with 3 simple setae, distal margin with 1 plumose seta; ischium posterior margin with 2 long annulate setae, distal margin with 2 annulate setae; merus as long as carpus, 4 long annulate setae distally, 1 short simple seta proximally; carpus posterior margin with 4 long annulate setae, distal margin with row of very stout, very long annulate setae; propodus as long as

dactyl, bearing single stout long annulate seta distally; dactyl margin with single pedunculate seta, distally 1 short stout seta (Fig. 8B).

Pleopod 1 biramous, peduncle lateral margin with 2 simple setae; endopod bi-articulate, distal article with 4 very stout long simple setae distally; exopod uni-articulate, bearing 6 long stout simple setae (Fig. 10C).

Pleopod 2 biramous, peduncle lateral margin with 2 short simple setae; endopod bi-articulate, distal article bearing 4 long stout simple setae; exopod uni-articulate, bearing 6 long stout simple setae (Fig. 8C).

Telson length 0.75 uropod length, pre-anal portion subequal to post-anal portion. Pre-anal portion produced as hump dorsally, with oval ridge surrounding a dorsal depression, hump serrated distally, otherwise unarmed. Post-anal portion very slender, with 6 pair simple setae laterally, 1 pair short stout simple setae terminally (Fig. 9B).

Uropod peduncles twice as long as rami, distal $\frac{2}{3}$ of medial margin armed with 22 short stout plumose setae with short setules. Uropod endopod 3-articulate, medial margin armed with 20 short stout plumose setae with short setules; articles 1 and 2 each with 1 slender seta at lateral distal corner; articles 2 and 3 each with 1 pair pedunculate setae on lateral proximal margin; article 3 with single stout seta and single slender seta terminally. Uropod exopod bi-articulate, article 2 with 5 slender setae laterally, 2 very long setae terminally (Fig. 9B).

Etymology.—The species is named for the type locality, Bahia Tongoy, Chile.

Diastylis crenellata Watling & McCann,
1997

Fig. 12

Material examined.—San Diego, California, 32°38.75'N, 117°20.06'W, 2 ovigerous ♀♀.

Description (amended).—As in Watling & McCann 1997, with the addition that pereopods 3 & 4 in the female bear rudimentary exopods (Fig. 12A, B).

Table 1.—A comparison of characters in *D. rathkii* and *L. longimana*, “typical” members of their genera, with those of *D. tongoyensis*, which represents a transitional group of species.

	<i>Diastylis rathkii</i> (Krøyer, 1841)	<i>Diastylis tongoyensis</i>	<i>Leptostylis longimana</i> (Sars, 1865)
Length of telson relative to telsonic somite	2 times that of telsonic somite	1.5 times telsonic somite	Shorter than telsonic somite
Length of telson relative to uropod peduncle	Equal to length of uropod peduncle	$\frac{2}{3}$ length of uropod peduncle	$\frac{1}{3}$ length of uropod peduncle
Number of pairs of lateral setae on telson	10 in adult ♀, 16 in adult ♂	3 in adult ♀, 6 in adult ♂	1 in adult ♀, 1 in adult ♂
Antenna 1 in adult male relative to female	Slightly laterally expanded, ring of setae terminally	Laterally expanded, ring of setae terminally	Greatly laterally expanded, multiple rings of setae terminally
Antenna 2 flagellum in adult male	Extends beyond telson	Extends beyond telson	Does not extend beyond thorax
Exopods on pereopods 3 & 4 in female	None	Rudimentary	Rudimentary

Discussion

As Day (1980) pointed out, the genera *Diastylis*, *Leptostylis*, and *Makrokyllindrus* are problematical because their definitions overlap to such an extent that it is impossible to separate them cleanly. Characters used to diagnose the genera *Leptostylis* and *Diastylis* include the number of lateral setae on the telson, relative proportions of the pre- and post-anal portions of the telson, and antennule morphology of the adult male. Species assigned to *Leptostylis* and *Diastylis* overlap in the telson to uropod peduncle ratio, length of telson relative to telsonic somite, lateral spination of the telson, exopod state on pereopod 3 and 4 of the female, and morphology of the adult male antennule. *Diastylis tongoyensis* is one of the species that fits within the current diagnosis of *Diastylis*, yet also exhibits characters similar to *Leptostylis*. Table 1 compares *D. tongoyensis* to “typical” species of *Diastylis* and *Leptostylis*, viz., *D. rathkii* (Krøyer, 1841) and *L. longimana* (Sars, 1865). For all the characters listed, *D. tongoyensis* is transitional between *D. rathkii* and *L. longimana*.

Within the genus *Diastylis*, there is a group of species, in concert with *D. tongoyensis*, that share the characters opercular

maxilliped 3, short telson, and rudimentary exopods on pereopods 3 & 4 in the female. The species included in this group are *D. abbotti* Gladfelter, 1975, *D. alaskensis* Calman, 1912, *D. calderoni* Donath-Hernandez, 1988, *D. crenellata* Watling & McCann, 1997, *D. insularum* Calman, 1908, *D. paratricinta* Kang & Lee, 1996, *D. pelucida* Hart, 1930, *D. planifrons* Calman, 1912, *D. sympterygiae* Bacescu & Lima de Quieroz, 1985. With the exception of *D. sympterygiae*, which is from the Southeast Atlantic, all are found in the North Pacific, East Pacific, or Antarctic. This species group seems to represent a transitional state between what is represented by the “typical” members of the genus *Diastylis* and those of *Leptostylis*.

A significant portion of the problem with separating these two genera is the lack of designated types. The designated type of *Diastylis* is *D. arenarius* Say, 1818; however, the original material is lost and the description is so vague that it could describe any adult male telson-bearing cumacean (Day 1980). In the case of *Leptostylis*, the genus was created for four species but no type was designated (Sars 1869, Day 1980). A proposal for designating *D. rathkii* as the type for *Diastylis* has been submitted to the ICZN.

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